

Lower Upper Miocene Progradational Play

UM1 P1, #1361

Discorbis 12

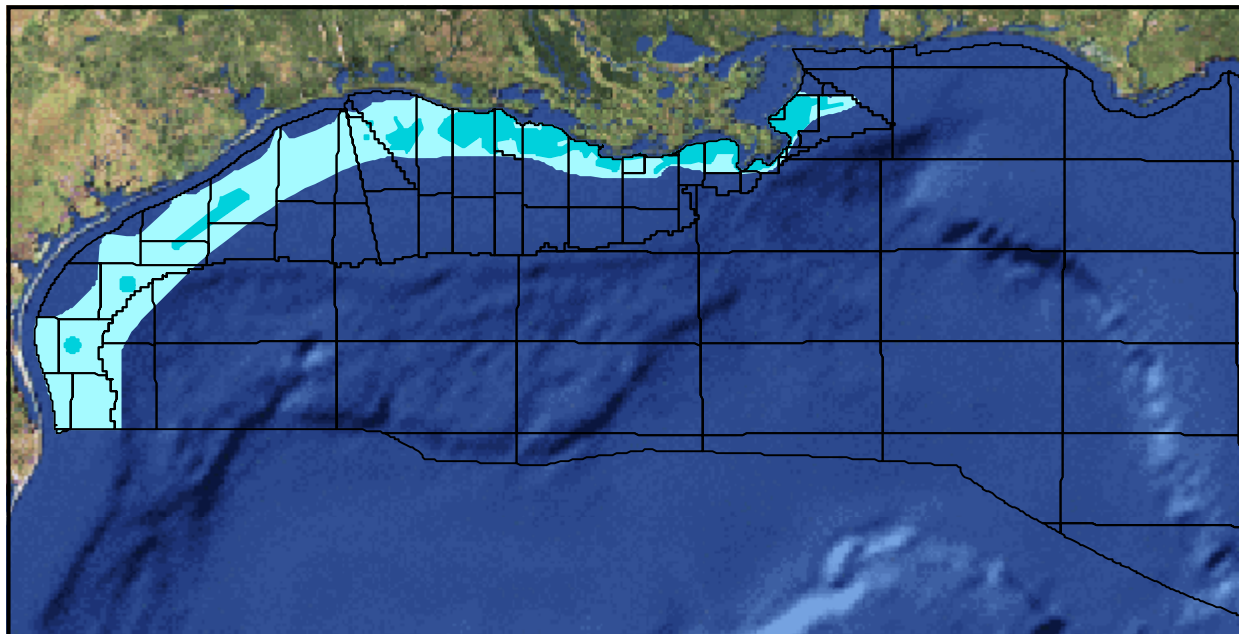


Figure 232. UM1 P1 map showing location of play. Play limit shown in light cyan; hydrocarbon limit shown in dark cyan.

Overview

The Lower Upper Miocene Progradational Play (UM1 P1) contains reserves of 9,167.610 Bcfg and 567.084 MMbo (2,198.331 MMBOE) in 492 sands in 111 fields. The play extends continuously across the modern GOM shelf from the South Padre Island to Main Pass Area ([Figure 232](#)).

Description

UM1 P1 is defined by (1) a progradational depositional style representing major regressive episodes in which sediments outbuild onto the shelf and slope and (2) the UM1 Chronozone, the top of which is defined by the *Discorbis 12* biozone ([Figure 8](#)).

UM1 P1 extends continuously across the modern GOM shelf from the South Padre Island Area offshore Texas to the Main Pass Area east of the modern Mississippi River Delta ([Figure 232](#)). In the Texas offshore, hydrocarbons have only been encountered in a few, small, discontinuous clusters.

However, hydrocarbon discoveries are numerous and extend across much of the entire Louisiana offshore.

UM1 P1 sands supplied by the South Brazos Delta System (Morton et al., 1985) in the Texas offshore are thinner, significantly fewer, and much less well developed than the UM1 P1 sands supplied by ancestral Mississippi River Deltas in the Louisiana offshore. This is a result of less clastic influx to the offshore Texas area than to the offshore Louisiana area during UM1 time because major depocenters were located offshore of southeastern Louisiana (Curtis, 1970). Also, upper Miocene sediments offshore Texas have been buried only 2,000-6,000 ft, which may result in thermal immaturity and lack of appreciable hydrocarbon generation (Morton et al, 1985).

In the Louisiana offshore, UM1 P1 deposits prograded significantly basinward from those of the Upper Middle Miocene Progradational Play (MM9 P1), specifically in the Eugene Island through Main Pass Area.

Play Limits

In an updip direction, UM1 P1 deposits grade into the sediments of the Lower Upper Miocene Aggradational Play (UM1 A1) or extend onshore. UM1 P1 continues to the southwest into onshore Texas and Mexican national waters. To the north-east, the play is limited by the deposits of the Lower Upper Miocene Aggradational/Progradational Play (UM1 AP1) overlying the lower Cretaceous carbonate shelf. UM1 P1 deposits grade into the sediments of the Lower Upper Miocene Fan 1 Play (UM1 F1) in a downdip direction.

Depositional Style

UM1 P1 is characterized by sediments deposited predominantly on the UM1 shelf, with less common, generally finer-grained sediments deposited on the UM1 upper slope. These sediments represent major regressive episodes in which outbuilding of both the shelf and the slope occur. Additionally, retrogradational, reworked sands with a thinning and backstepping log signature locally cap the play. Because these retrogradational sands are poorly developed, discontinuous, and not correlatable for any significant distance, they are included as part of UM1 P1. The UM1 progradational interval varies from approximately 50 to more than 5,000 ft in thickness, with net sand thicknesses as much as approximately 700 ft.

The 29 reservoir sands of the offshore Texas area formed mainly as shelf blanket sands, delta fringe sands, and crevasse splay deposits in the distal portions of prograding deltaic lobes or offshore bars. Most of these sands have a coarsening-upward log character, but some fining-upward sands are also present in the overall prograding section. Many of these sands are thin and poorly developed caused by a low influx of clastic detritus in the offshore Texas area during UM1 time. The paucity of clastic detritus led to the deposition of thick shale intervals without sand. Thus, many UM1 progradational sands in the Texas offshore have not been prolific producing reservoirs. In fact, in the South Padre Island and High Island Areas, the progradational facies is present but not productive.

The 463 reservoir sands of the offshore Louisiana area formed mainly as delta fringe sands, channel/levee complexes, and distributary mouth bars. These facies exhibit upward-coarsening (delta fringe and distributary mouth bar) and blocky to upward-fining (channel/levee) log signatures. The thickest sand-dominated intervals probably repre-

sent stacked facies of multiple episodes of delta-lobe switching and progradation. Shelf blanket sands and delta slump deposits are also present, but less common. These deposits are often characterized by isolated, prominent, and subdued spiky log patterns. From the West Cameron through Vermilion Areas, UM1 P1 deposits are characterized by predominately thin, coarsening-upward sands separated by thick, clean shales. The central offshore Louisiana area was the locus of the main UM1 deltaic depocenter resulting in abundant, well-developed, thick sands. East of the Mississippi River Delta, the UM1 P1 sediments are mostly shale with a few well-developed sands.

Structural Style

The majority of the fields in this play are structurally associated with normal faults, anticlines, and salt diapirs—shallow, intermediate, and deep depths—with hydrocarbons trapped on diapir flanks or in sediments draped over diapir tops. Other fields are structurally associated with growth fault anticlines, while some fields contain hydrocarbon accumulations trapped by permeability barriers and updip pinchouts or facies changes.

Quantitative Attributes

On the basis of reserves calculations, UM1 P1 contains 74% gas and 26% oil. The 492 sands in the play comprise 965 reservoirs, of which 636 are nonassociated gas, 257 are undersaturated oil, and 72 are saturated oil. Proved reserves are estimated at 9,166.747 Bcfg and 566.489 MMbo (2,197.583 MMBOE) in 490 sands in 110 fields ([Table 109](#)). Unproved reserves are estimated at 0.863 Bcfg and 0.594 MMbo (0.748 MMBOE) in 2 sands in 1 field. These proved plus unproved reserves account for 72% of the reserves for the UM1 Chronozone.

Of all 65 GOM plays, UM1 P1 ranks fifth in gas production (6%). Cumulative production from UM1 P1 totals 8,304.278 Bcfg and 511.789 MMbo (1,989.419 MMBOE) from 477 sands in 110 fields.

	No. of Sands	Oil (MMbbl)	Gas (Bcf)	BOE (MMbbl)
Proved	490	566.489	9,166.747	2,197.583
Cum. production	477	511.789	8,304.278	1,989.419
Remaining proved	201	54.700	862.469	208.165
Unproved	2	0.594	0.863	0.748

Table 109. UM1 P1 reserves and cumulative production.

UM1 P1 production accounts for 86% of the UM1 Chronozone's total production. Remaining proved reserves in the play are 862.469 Bcfg and 54.700 MMbo (208.165 MMBOE) in 201 sands in 72 fields.

[Table 110](#) summarizes that water depths of the fields in UM1 P1 range from 9-380 ft, and play interval discovery depths vary from 3,689-17,800 ft, sub-sea. Additionally, porosity and water saturation range from 14-35% and 16-72%, respectively.

492 Sands	Min	Mean	Max
Water depth (ft)	9	51	380
Subsea depth (ft)	3,689	10,915	17,800
Reservoirs per sand	1	2	21
Porosity	14%	26%	35%
Water saturation	16%	30%	72%

Table 110. UM1 P1 sand attributes. Values are volume-weighted averages of individual reservoir attributes.

Exploration History

UM1 P1 has a 52-year history of discoveries ([Figure 233](#)). The first sands in the play were discovered in 1947 in the Vermilion 71 Field. The maximum number of sands discovered in any year occurred in 1984 with 26 sands from 10 fields. However, the maximum yearly reserves of 205.054 MMBOE were added in 1964 with the discovery of 19 sands from 9 fields. Sand discoveries averaged about 11 per year until 1988. Since then, the sand discovery average dropped to about 5 per year.

Containing just over 76 MMBOE each, the two largest sands in the play were discovered in 1949 in the Eugene Island 32 and in 1966 in the West Delta

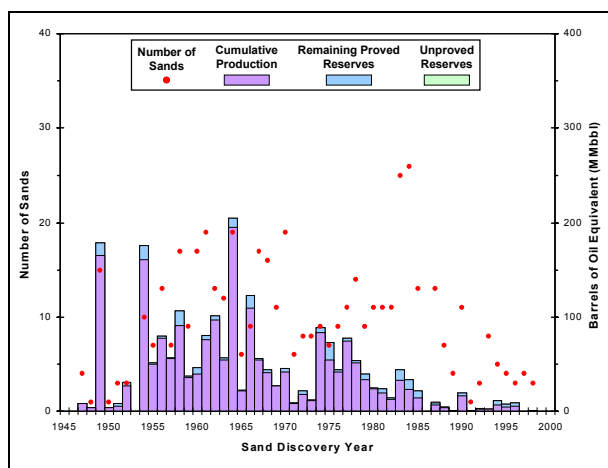


Figure 233. UM1 P1 exploration history graph showing reserves and number of sands discovered by year.

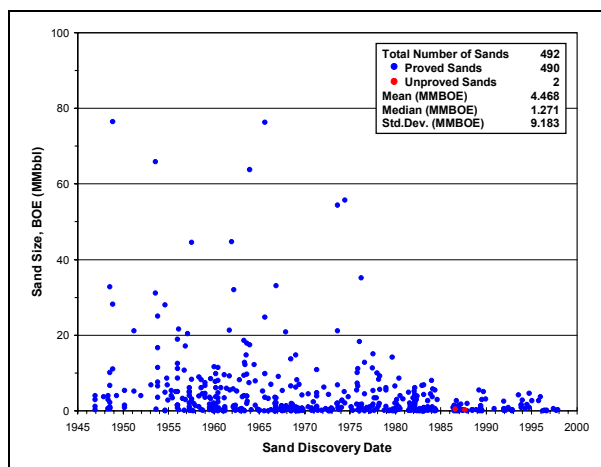


Figure 234. UM1 P1 sand discovery graph showing the size of sands discovered by year.

79 Field ([Figure 234](#)). No sand containing more than 20 MMBOE has been discovered since 1977. The mean sand size for the play is 4.468 MMBOE. Since the first Atlas database cutoff of January 1, 1995, 14 sands have been discovered, the largest of which is estimated to contain 4.583 MMBOE.

Production History

UM1 P1 has a 49-year history of production ([Figure 235](#)). Oil and gas production began in 1950 and 1951, respectively, and increased fairly steadily during the 1950's and 1960's. Oil production peaked in 1970, while gas production peaked in 1972. Since their peak years, oil and gas production have both declined steadily to about half their peak values.

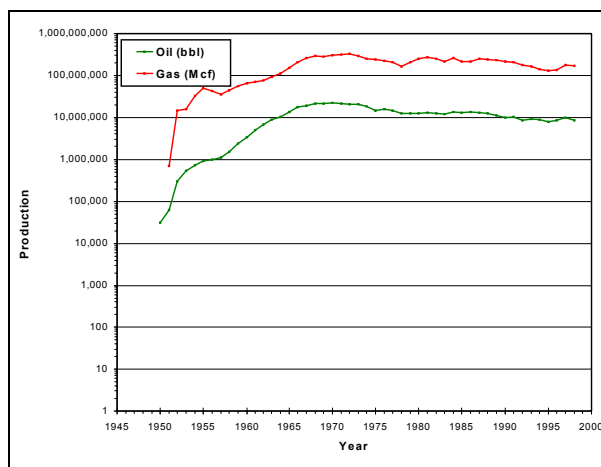


Figure 235. UM1 P1 production graph showing oil and gas production by year.